

# **The Ambulatory Care Information System -- Augmenting DHCP with PC Workstations and a Local Area Network**

Steven H. Rappaport, M.D.

UCLA - San Fernando Valley Program, VA Medical Center Sepulveda CA

The Ambulatory Care Information System (ACIS) is a computer environment serving the clinical, administrative and educational information needs of the Primary Ambulatory Care and Education (PACE) clinics at the Sepulveda VA Medical Center. ACIS has been designed to help: (1) improve patient satisfaction with the ambulatory care encounter, (2) improve quality of care, (3) enhance provider education, and (4) promote the efficient utilization of ambulatory care services. In the past two years, ACIS has grown to encompass approximately 180 IBM compatible personal computers (PC's) linked by a local area network (Microsoft LAN Manager). The PC's share data residing on network file servers and are able to exchange data automatically with the VA Hospital Information System (DHCP). PC's are located in examining rooms, attending and pharmacist offices, clerical, administrative and patient education areas and nursing stations. Via wireless pen-based laptop PC's (AST GRID Convertible, Solectek wireless ethernet) housestaff browse patient records in examining rooms while documenting encounters in the presence of attending physicians in conference areas. ACIS has been in operation since October 1992 and currently assists in processing more than 250 patient visits each day.

ACIS offers a mixture of locally developed (using Toolbook by Asymetrix and Visual Basic by Microsoft) and commercial software applications. Clerical staff use ACIS for assistance in checking patients in and out of the clinic and in recording the activities that occur during visits. ACIS automates many of the interactions clerks routinely perform with the hospital mainframe and, via the graphical capabilities of PC workstations, is able to simplify data entry tasks. As patients check-in, ACIS automatically retrieves clinical data from DHCP and from local file servers, organizing these data into an encounter form customized to each patient visit. Clinicians and nurses use ACIS to view and add to a patient's problem list, prior progress notes, medication and laboratory profiles, allergy and immunization data, previous vital signs and selected recent orders. The system offers advice, based on locally and nationally developed practice guidelines,

regarding what issues should be addressed in evaluating certain patient complaints and diagnoses. It also offers interactive disposition suggestions, home care instructions and test ordering options to nurses as they respond to phone calls from patients. Administrative staff use ACIS in analyzing provider practice patterns and in reviewing progress note quality for total quality improvement tasks. The commercial applications available through ACIS include on-line medical reference materials, patient education handouts and literature searching tools, expert differential diagnostic and decision support programs and directories of patient services and education classes.

ACIS helps increase patient satisfaction by promoting more efficient clinic operation and resource utilization. ACIS tracks the amount of time patients spend with providers and support staff and how much time is spent waiting. This facilitates an orderly passage of patients through the clinic and prevents patients from being forgotten. The system also identifies patients who have not had a visit with their primary care provider within a set time interval or patients who may benefit from services they are not receiving such as a geriatrics evaluation.

ACIS promotes the delivery of quality care and enhances provider education by offering rapid access to information. The customized encounter form and the electronic medical record capabilities of ACIS offer clinicians a more complete understanding of their patients, leading to more informed treatment decisions. Given easy access to medical textbooks and journals, providers may more frequently review medical literature and learn from clinical encounters. The problem specific prompts offered by ACIS additionally provide passive education as to what issues are important to address in evaluating and following patient problems.

By integrating the database capabilities of DHCP with the functionality of PC based clinical workstations and the adaptability of local area networks, ACIS has produced important benefits in the care of patients in the ambulatory care arena.